

The Causal Relationship Between Stock Prices and the Real Sector of the Economy in Pakistan

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Abstract: The purpose of the research is to examine the causal relationship between stock prices and the variables representing the real sector of the economy like real GDP and real investment, in Pakistan. The researchers used annual data (quarter-wise) from December, 1980 to June, 2007 and apply the simple correlation analysis, to investigate the relationship. The descriptive statistics indicate a much higher expansion in stock prices relative to real variables. However, the stock prices also experienced much higher volatility during the sample period whereas the real variables seem to be stable. The correlations are very low and not significant in the cases of GDP and investment in full sample period. The first sub-sample, consisting of pre-reform period, the correlations is again very low and not significant. The post reform period shows a significant increase in correlation coefficients. In particular, the correlation between stock prices and GDP is very high. Correlation with GDP increased significantly in the post liberalization period from -0.26 to 0.1. The correlation analysis shows low correlations between stock prices and macro variables. However, there is evidence of significant increase in these correlations in the period subject to reforms, suggesting that these reforms resulted in significant improvement in the behaviour of stock market and its linkages to the economy.

Key words: Causal Relationship · Stock Prices · Real Sector of the Economy · Pre-Liberalization and Post-Liberalization

INTRODUCTION

The stock market plays an important role in the economy by mobilizing domestic resources and channeling them to productive investment. This implies that it must have significant relationship with the economy. The relationship can be seen, in general, in two ways. The first relationship views the stock market as the leading indicator of the economic activity in the country whereas the second focuses on the possible impact the stock market may have on aggregate demand particularly through aggregate consumption and investment. In other words, whether changes in stock market cause fluctuations in macroeconomic variables, like Consumption Expenditures, Investment Spending, Gross Domestic Product (GDP), Index of Industrial Production (IIP), etc., or are caused by these variable is an interesting issue to be examined. The former case implies that stock market leads economic activity whereas the latter suggests that it lags economic activity.

The knowledge of the relationship between stock prices and macro variables is now becoming more important in the case of developing countries in view of the various economic reforms taking place there. Starting in the beginning of the 1990s there have been a number of measures taken for economic liberalization, privatization, relaxation of foreign exchange controls and in particular the opening of the stock markets to international investors. These measures resulted in significant improvements in the size and depth of stock markets in developing nations and they are beginning to play their due role [1].

The issue whether stock market leads or lags economic activity is now becoming very crucial in Pakistan, as the stock market has gained much attraction in the last few years. The market has been, in general, among the best performing markets. The indicators like market capitalization, trading volume, the market index has shown phenomenal growth. These developments are often claimed by the authorities to be an indication of

economic progress of the country. It would be useful to examine whether these developments has influenced the economy, particularly the real sector. Moreover, the relationship between stock prices and the real sector variables is also important in view of the various economic reforms started in early 1990s. The measures taken for economic liberalization, privatization, relaxation of foreign exchange controls and in particular the opening of the stock markets to international investors are supposed to have great impacts on the economy including the real sector [2].

Previous Research: The theoretical basis to examine the link between stock prices and the real variables are well established in economic literature, e.g., in Baumol [3], Bosworth [4]. The relationship between stock prices and real consumption expenditures, for instance, is based on the life cycle theory, developed by Ando and Modigliani [5], which state that individuals base their consumption decision on their expected lifetime wealth. Part of their wealth may be held in the form of stocks linking stock price changes to changes in consumption expenditure. Finally, the relationship between stock prices and GDP, a measure of economic activity, indicates whether the stock market leads or lags economic activity.

The empirical evidence, particularly in the South Asian region, regarding the direction of causality between stock prices and the real variables is not conclusive. For example, a unidirectional causality from stock prices to consumption expenditures is observed by Nishat and Saghir [6] in Pakistan and Ahmed [7] in Bangladesh whereas Mookerjee [8] observes the opposite case in India. Similarly, Mookerjee [8] and Ahmed [7] report a unidirectional causality from stock prices to investment spending for India and Bangladesh respectively whereas the opposite case is reported by Nishat and Saghir [6] for Pakistan. Regarding causal relation between stock prices and economic activity Mookerjee [8] finds evidence that GDP leads stock prices in India whereas Nishat and Saghir [6] find the opposite evidence in Pakistan. On the other hand, Ahmed [7] finds the evidence that Index of Industrial Production (IIP) leads stock prices in Bangladesh. In another study for Pakistan, Hussain and Mahmood [1], covering the data from 1959/60 to 1998/99 report a unidirectional causality from the macro economic variables, GDP, consumption, investments, to stock prices implying that the stock market lags economic activity and thus cannot be characterized as the leading indicator of the economy in Pakistan.

Further, Korajczyk [9] shows that emerging markets have become more integrated with world capital markets during the past seven years. The blossoming of emerging stock markets has attracted the attention of international investors. Portfolio equity flows to emerging markets jumped from \$150 million in 1984 to over \$39 billion in 1995. Yet, there exists very little empirical evidence on the relationship between stock market development and long-run economic growth. To assess whether stock markets are merely burgeoning casinos where more and more players are coming to place bets or whether stock markets are importantly linked to economic growth, this paper reviews a diffuse theoretical literature and presents new empirical evidence. In terms of theory, a growing literature argues that stock markets provide services that boost economic growth.

Greenwood and Smith [10] show that large stock markets can lower the cost of mobilizing savings and thereby facilitate investment in the most productive technologies. Bencivenga, Smith and Starr [11] and Levine [12] argue that stock market liquidity -- the ability to trade equity easily is important for growth. Specifically, although many profitable investments require a long-run commitment of capital, savers do not like to relinquish control of their savings for long periods. Liquid equity markets ease this tension by providing an asset to savers that they can quickly and inexpensively sell. Simultaneously, firms have permanent access to capital raised through equity issues.

Moreover, Kyle [13] and Holmstrom and Tirole [14] argue that liquid stock markets can increase incentives to get information about firms and improve corporate governance. Finally, Obstfeld [15] shows that international risk sharing through internationally integrated stock markets improves resource allocation and can accelerate the rate of economic growth. Theoretical disagreement exists, however, about the importance of stock markets for economic growth. Meier [16] argues that even large stock markets are unimportant sources of corporate finance. Stieglitz [17, 18] says that stock market liquidity will not enhance incentives for acquiring information about firms or exerting corporate governance.

Devereux and Smith [19] emphasize that greater risk sharing through internationally integrated stock markets can actually reduce saving rates and slow economic growth. Finally, Shleifer and Summers' [20] and Morck, Shleifer and Vishny's [21] analyses that stock market development can hurt economic growth by easing counterproductive corporate takeovers. Considering the

conflicting theoretical perspectives on the importance of well-functioning stock markets for economic growth, this paper uses cross-country regressions to examine the association between stock market development and economic growth. To conduct this investigation, we need measures of stock market development. Theory, however, does not provide a unique concept or measure of stock market development. Theory suggests that stock market size, liquidity and integration with World capital markets may affect economic growth.

This builds on Atje and Jovanovic's [22] study of stock market trading and economic growth in two ways. They use conglomerate indexes of stock market development that combine information on stock market size, trading and integration. Second, they control for initial conditions and other factors that may affect economic growth in light of evidence that many cross-country regression results are fragile to changes in the conditioning information set. Thus, they gauge the robustness of the relationship between overall stock market development and economic growth to changes in the conditioning information set. We find a strong correlation between overall stock market development and long-run economic growth.

Saint-Paul [23], Devereux and Smith [19] and Obstfeld [15] demonstrate that stock markets provide a vehicle for diversifying risk. These models also show that greater risk diversification can influence growth by shifting investment into higher-return projects. Intuitively, since high expected-return projects also tend to be comparatively risky, better risk diversification through internationally integrated stock markets will foster investment in higher return projects. Again, however, theory suggests circumstances when greater risk sharing slows growth. Devereux and Smith [19] and Obstfeld [15] show that reduced risk through internationally integrated stock markets can depress saving rates, slow growth and reduce economic welfare.

Stock markets may also promote the acquisition of information about firms [24, 14]. Specifically, in larger, more liquid markets, it will be easier for an investor who has gotten information to trade at posted prices. This will enable the investor to make money before the information becomes widely available and prices change. The ability to profit from information will stimulate investors to research and monitor firms. Better information about firms will improve resource allocation and spur economic growth. Opinions differ, however, over the importance of stock markets in stimulating information acquisition. Stiglitz [17, 18], for example, argue that well functioning

stock markets quickly reveal information through price changes. This quick public revelation will reduce - not enhance - incentives for expending private resources to obtain information. Thus, theoretical debate still exists on the importance of stock markets in enhancing information.

Levine and Zervos [25] conduct a similar analysis for 48 countries and for the period 1976-1993, but focus on the role played by the stock market. They measure stock market development along various dimensions: size, liquidity, international integration and volatility. More precisely their measures are aggregate stock market capitalization to GDP and the number of listed firms (size), domestic turnover and value traded (liquidity), integration with world capital markets and the standard deviation of monthly stock returns (volatility).

Research Methodology

Data and Methodology: The study was based on annual data from December 1980 to June 2007 [26], to investigate the causal relations of stock prices with the variables of the real sector in Pakistan, specifically the real GDP and the real investment spending. The sample is further classified into two sub-samples to take care of the economic liberalization program started in the early 1990s. Hence, Sample-I, from December 1980 to March 1991, covers the period prior to the start of the liberalization program whereas, Sample-II, from April 1991 to June 2007 represents the post-liberalization period. Similarly in regression analysis the researcher include a dummy variable from April 1999 to June 2007 to take care of the possible shift in relations between variables due to economic liberalization program.

Data Sources: State Bank General Price Index (SBGPI) represented stock prices with base 1980-81. Similarly, investment spending and GDP at constant prices of 1980-81 are used as variables representing the real sector of the economy. The principal data source is the National Accounts of Pakistan, 2007, prepared by the Federal Bureau of Statistics. The other data sources include Economic Surveys by The Finance Division, 2006-07 and Annual Reports, 2006 & 2007 by the State Bank of Pakistan, the central bank.

Descriptive Statistics: This study is based on the descriptive statistics that shows the basic characteristics of the variables used in the analysis. An easy and quick way to know the relationship between stock prices and macro variables is to find the correlations between them.

Table 1(a): Descriptive Statistics for Growth in Stock Prices and Macro Variables: Total Sample: Dec. 1980 – June 2007

Descriptive Statistics			

(Dec. 1980 - June 2007)			
	D(SP)	D(GDP)	D(INV)
Mean	0.0286	0.0099	0.0107
Std. Dev.	0.1184	0.1452	0.1221
Skewness	0.4776	0.5598	-0.7757
Kurtosis	3.8994	2.0286	3.5678
Observations	106	106	106

Table 1(b): Descriptive Statistics for Growth in Stock Prices and Macro Variables: Sample I: Pre Liberalization: Dec. 1980 – March 1991

Descriptive Statistics			

(Dec. 1980 – March 1991)			
	D(SP)	D(GDP)	D(INV)
Mean	0.0300	0.0126	0.0189
Std. Dev.	0.0451	0.1618	0.1108
Skewness	0.3597	0.4698	-0.7423
Kurtosis	3.8060	1.9229	3.3115
Observations	41	41	41

Table 1(c): Descriptive Statistics for Growth in Stock Prices and Macro Variables: Sample II: Post Liberalization: April 1991 – June 2007

Descriptive Statistics			

(April 1991 - June 2007)			
	D(SP)	D(GDP)	D(INV)
Mean	0.0277	0.0081	0.0056
Std. Dev.	0.1475	0.1349	0.1292
Skewness	0.4177	0.6270	-0.7520
Kurtosis	2.6687	2.0122	3.5110
Observations	65	65	65

Correlation Coefficient: As a preliminary analysis, the correlation coefficients are calculated. In addition to the full sample, the correlations are also calculated for two sub-samples consisting of periods from December 1980 to March 1991 and from April 1991 to June 2007. The division of the sample is done to examine the effects of various economic reforms on the relationship.

Dummy Variable: As mentioned above, the Pakistan economy has been brought under various economic reforms in the 1990s [2]. The most significant measure is the opening of the Pakistani equity market to international investors in early 1991. To take care of these reforms, a dummy variable is used for the period from April 1991 to June 2007.

Data Analysis: The empirical results or the survey findings and interpretations of the study are discussed as below:

Descriptive Statistics for Growth in Stock Prices and Macro Variables: The undertaken study presenting the descriptive statistics of the variables used in the analysis in following three Tables:

The summary of the descriptive analysis of the data divided into three periods as the total sample comprising from December, 1980 to June, 2007, whereas, the whole set of data again divided into two period, first is called Pre liberalization period which comprising from December, 1980 to March, 1991 and the Post liberalization period is from April, 1991 to June, 2007.

The tables' 1a, 1b and 1c indicate that the stock market in Pakistan provides an average quarterly return just under 2.86%. On the other hand, the average annual growths in real variables are lower, i.e., just under 1% in GDP, whereas, slightly over 1% in investments. However, the volatility in the stock price index, measured by the standard deviation, is much higher relative to the real variables. The real variables seem to be much stable during the sample period.

A comparison of the descriptive statistics between the two sub-periods indicates decline in the average growth in real variables. Hence, real GDP fell from 1.26% to 0.81% whereas real investment decreased from 1.89% to 0.56%. However, the decline is significant both in GDP and investment. Though the magnitude of the average growth in stock price index increased in the second period it is not significantly different from that of the first period. On the other hand, the stock price is the only variable that experienced significant increase in volatility in the second period. In the case of real variables the variances are not significantly different between the two sub-periods. Therefore, it is concluded that the average quarterly return for the full sample is 2.86%, whereas, the average return fell from 3.00% to 2.77% in sample II but volatility increased more than three times from 4.50 to 14.75.

The Correlation Coefficient of Stock Prices and Macro Variables: The correlation coefficient of stock prices changes with changes in real investment and real GDP are presented as follows:

The Table 2-a, shows that the correlations are very low and not significant in the cases of GDP and investment. Similarly, in Table 2-b, the first sub-sample, consisting of pre-reform period, the correlations are again very low. However, the post reform period shows a

Table 2(a): Correlation Coefficients between Stock Prices and Macro Variables: Total Sample: Dec. 1980 – June 2007

Correlations			

(Dec. 1980 - June 2007)			
	D(SP)	D(GDP)	D(INV)
D(SP)	1.0000	0.0287	0.0427
D(GDP)	0.0287	1.0000	0.6702
D(INV)	0.0427	0.6702	1.0000

Table 2(b): Correlation Coefficient between Stock Prices and Macro Variables: Sample I: Pre Liberalization: Dec. 1980 – March 1991

Correlations			

(Dec. 1980 – March 1991)			
	D(SP)	D(GDP)	D(INV)
D(SP)	1.0000	-0.2595	0.0155
D(GDP)	-0.2595	1.0000	0.6594
D(INV)	0.0155	0.6594	1.0000

Table 2(c): Correlation Coefficient between Stock Prices and Macro Variables: Sample II: Post Liberalization: April 1991 – June 2007

Correlations			

(April 1991 - June 2007)			
	D(SP)	D(GDP)	D(INV)
D(SP)	1.0000	0.1000	0.0500
D(GDP)	0.1000	1.0000	0.6924
D(INV)	0.0500	0.6924	1.0000

significant increase in correlation coefficients in Table 2-c, indicating the beginning of association of stock prices with real variables following liberalization measures. In particular, the correlation between stock prices and GDP is high as compared to INV. Correlation with GDP increased significantly in the post liberalization period from -0.26 to 0.1.

CONCLUSION

The summary and conclusion of the study and the recommendations on the basis of the empirical results are given as follows:

Summaries and Conclusion: The purpose of the research is to examine the causal relationship between stock prices and the variables representing the real sector of the economy like real GDP and real investment, in Pakistan. The researchers used annual data (quarter-wise) from

December, 1980 to June, 2007 and apply the simple correlation analysis, to investigate the relationship. The summary and the conclusion of the study are presented as below:

- The summary of the descriptive analysis of the data divided into three periods as the total sample comprising from December, 1980 to June, 2007. The whole set of data again divided into two period, first is called Pre liberalization period which comprising from December, 1980 to March, 1991. The Post liberalization period is from April, 1991 to June, 2007.
- The stock market in Pakistan provides an average quarterly return is 2.86%. The average annual growths in real variables are lower, i.e., just under 1% in GDP and slightly over 1% in investments.
- A comparison of the descriptive statistics between the two sub-periods indicates decline in the average growth in real variables. Real GDP fell from 1.26% to 0.81% whereas real investment decreased from 1.89% to 0.56%. The decline is significant both in GDP and investment. Though the magnitude of the average growth in stock price index increased in the second period it is not significantly different from that of the first period.
- The stock price is the only variable that experienced significant increase in volatility in the second period. In the case of real variables the variances are not significantly different between the two sub-periods.
- It is concluded that the average quarterly return for the full sample is 2.86%, whereas, the average return fell from 3.00% to 2.77% in sample II but volatility increased more than three times from 4.50 to 14.75.
- The descriptive statistics indicate a much higher expansion in stock prices relative to real variables. However, the stock prices also experienced much higher volatility during the sample period whereas the real variables seem to be stable.
- The correlations are very low and not significant in the cases of GDP and investment in full sample period. The first sub-sample, consisting of pre-reform period, the correlations is again very low and not significant.
- The post reform period shows a significant increase in correlation coefficients. In particular, the correlation between stock prices and GDP is very high. Correlation with GDP increased significantly in the post liberalization period from -0.26 to 0.1.

- The correlation analysis shows low correlations between stock prices and macro variables. However, there is evidence of significant increase in these correlations in the period subject to reforms, suggesting that these reforms resulted in significant improvement in the behaviour of stock market and its linkages to the economy.

Recommendations: The study clearly indicates that it lags economic activity i.e. the Stock market does not lead the economy rather the economy leads the Stock market. Therefore, individuals, institutions and government should be aware of speculative bubbles. In the absence of other strong economic indicators, shooting up of stock prices should be dealt with care by all the stake holders.

It is further recommended that the government should take further appropriate steps in order to rectify the market development of better financial infrastructure for operation of stock markets. These include strengthening of regulatory provisions and better enforcement, improvements in information systems and mechanisms for payments, more neutral application of fiscal policy to all types of financial instruments, higher standards of disclosure of financial information by companies and greater scope for financial innovation within a flexible regulatory framework. Researcher expects that progress in these areas will enhance substantially the role of stock markets in the economic development of Pakistan incoming years.

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